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## Stream Channel Protection, BMP 14.17

### Objectives

- 1) To protect stream channels by creating a temporary emergency overflow for spring flooding prior to culvert upgrading.

### Site Description

The two sites are located on the Foothills Road 5498, at the Camp Creek and Soldier Creek crossings. They are on the Ninemile Ranger District, on the Lolo NF, Section 24, Township 17N, Range 23W. LSI Classification is 10UA.

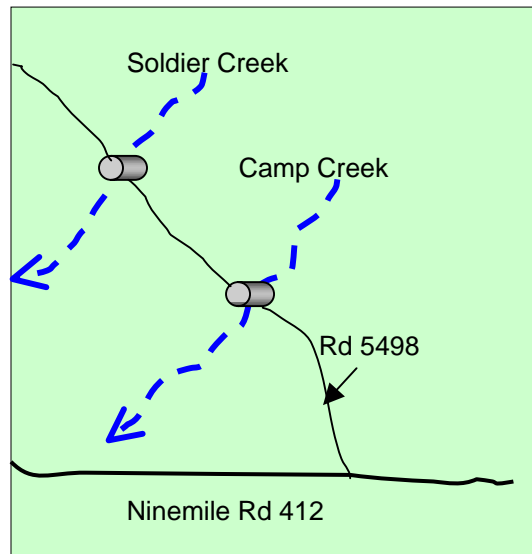


Figure 1

### Narrative

Most of Camp and Soldier Creek drainages upstream of the Foothills Road, burned severely in the summer of 2000. Where fires burned with high intensity, canopy cover and much of the understory vegetation were consumed. Where fires burned with moderate intensity, vegetation is sparse and canopy cover was reduced. The reduced canopies intercept less rain, increasing the amount and velocity of water flowing down slope.

Under unburned circumstances, the existing culverts would have been sufficient in passing stream flow. However, intense short-duration storms are usually accompanied by high stream peak flows, resulting in significant erosion after fires (Neary and others, 1999). Because of the increased flows predicted, the culverts had a high potential for failure and subsequent severe channel damage.

To accommodate the anticipated increase in runoff, temporary emergency overflow measures were implemented until the installation of the new culverts took place.

A large drain dip was constructed over the culvert, in order for water to flow over the road without eroding the fill and greatly reducing the risk of road failure, sedimentation, and channel scouring.

The fills over the culverts were excavated to accommodate the calculated volume of a 100-year flood. A spillway was constructed at each crossing to let water pass safely over the road (photos 1 & 2). A layer of large rocks was placed along the bottom of each spillway, with a layer of smaller rocks on top. The rock layers armor the road, reducing the amount of sediment available (photos 3 & 4). The culvert inlets and outlets were rock armored (photos 5 & 6). Finally, slash-filter windrows were constructed at the culvert outlets to further filter sediment and to increase bank stability (photo 7).



Photo 1 - Camp Creek before rock layers



Photo 2 - Soldier Creek before rock layers

## Observations and Measurements

Rocks, 1 to 3 feet thick, were used to armor the inlet at Camp Creek and 1 to 2 feet thick at Soldier Creek. Rock armoring was securely placed, increasing bank stability and protecting the banks from erosion at both sites.

The slash-filter windrow over the outlet of Camp Creek was built of large branches.



Photo 3 - Camp Creek rock layering



Photo 4 - Soldier Creek rock layering with straw wattles over grass seed and mulch, protecting the cutslope on the far side of crossing



Photo 5 - Camp Creek's armored inlet



Photo 6 - Soldier Creek's armored inlet



Photo 7 - Camp Creek slash-filter windrow

## Effectiveness

This emergency treatment was in place for less than one year. Larger culverts were installed during the summer of 2001. A mild winter with low snowfall and a later season of no intense rainstorms avoided putting the treatments to a test. Peak flows from recently burned areas increased 556 percent over adjacent unburned areas (Croft and Martson, 1950). If peak flows reached these rates, this practice would minimize stream impacts.